Suzaku News You Can Use

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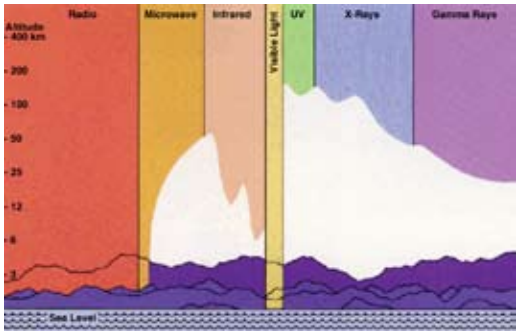
About The Mission

— Why do we observe x-rays from space?



This question reflects both the science and economics of astronomical observations in general. It is certainly less expensive to observe from the ground, but not always useful. Earth’s atmosphere filters energy coming from space, allowing only some wavelengths of light to reach the surface, working much like a pair of sunglasses.

Energy in the radio and visible ranges of the electromagnetic spectrum pass through the atmosphere with little filtering, but x-rays will not. (For a comparison between x-rays and other forms of “light” or electromagnetic radiation, see the “Imagine the Universe!” site: http://imagine.gsfc.nasa.gov/docs/science/know_l1/emspectrum.html). The only way to detect and study x-rays in a reliable, thorough fashion is from space. Suzaku is the newest x-ray observatory in a series of such space-based observation platforms.

Space-based observatories need not be in orbit around Earth. Other possibilities include orbits around Earth-Moon or Earth-Sun Lagrangian points — where physical forces from each body are balanced in such a way as to allow spacecraft to maintain stable orbits (more on the Lagrange points at the WMAP site: http://map.gsfc.nasa.gov/m_mm/ob_techorbit1.html) Another possibility is the Moon, long proposed as a platform for observatories in all wavelengths, as well as for particles in space (cosmic rays).

Resources For All

— Science from the scientists!

Jupiter, Algol, and the center of the Milky Way are among the targets to be studied in the coming months by Suzaku. Since”studied” is such a vague term, perhaps some clarification is in order.

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As you know, scientists are looking for data that will help to confirm or refute models of how the universe and its inhabitants operate. Once data is gathered, astrophysicists interpret and present this data for peer review. One of the best places to find such information presented is the astro-ph website at http://arxiv.org/list/astro-ph/new. This is an archive site for astrophysics articles, maintained and funded by Cornell University. If you navigate to the site's home page, you will find many branches of science and mathematics, as well as other disciplines, represented.

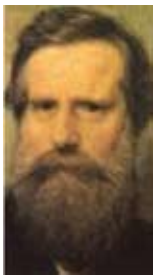
While Chandra X-Ray Observations of Nineteen Millisecond Pulsars in the Globular Cluster 47 Tucanae might not sound like a compelling read, it presents science in the format that research scientists work with it. We suggest that you look at a few articles that seem within your academic reach, and then discuss this resource with your class. Soon, articles that incorporate Suzaku data will begin to appear. By presenting this to your students as a resource, they can see that science is sometimes less like a group of science fair projects, and more like an organic, collaborative field involving thousands of people and spanning the globe!

Resources For All

— Suzaku presentation materials

Many NASA presentation materials are available on the web for global access and use, and Suzaku materials are no exception. The Suzaku (formerly Astro-E2) Educator Workshop Powerpoint presentation, including video clips, can be found on the Learning Center site: http://heasarc.nasa.gov/docs/astroe_lc/education/education.html. This presentation may be shown to groups of students or other teachers. Or you can use it for student"sponge" times, when you need to augment some curricular time, or as a web quest with the accompanying video clips. Take a look at the presentations and videos, and if you have any suggestions, we would love to hear them: suznuzfeedback@athena.gsfc.nasa.gov.

A Brief History Of X-Rays: The "dark ages" of x-rays



The discovery and use of x-rays, especially in the medical profession, blossomed between 1895 and 1900. Unfortunately, scientists and medical professionals were just finding out about the negative side-effects that x-rays carried. Findings that people could be injured, burned, and even killed followed over the course of the next decade. It became obvious that some type of detector was needed to let a person know if they had been exposed to too many x-rays.

The first answer to this came from going back to the discovery of x-rays. Photographic plates were used, since they would show change as they were exposed. A second answer was almost concurrently developed by William Crookes, who noted that a zinc sulfide surface illuminated when in the presence of radium. Crookes coined the term "spinthariscope" to name his device, from the Greek word for scintillation.

Like the pet rock later, the spinthariscope became a "must-have"

phenomenon. Small enough to be given as a present, and giving a teasing, new visual sensation, these objects were able to detect individual radiation events, such as the decay of radium. They developed into a new type of radiation detector that was much more exact than the photographic plate, which degraded over time. Pictured is a spinthariscope from the 1950s. It was originally part of an “atomic energy” chemistry set.

Over time, better instrumentation was developed that provided better accuracy for those exposed to radiation from x-rays, but spinthariscopes can still be found today as toys or in educational use.

- http://www.orau.org/ptp/collection/spinthariscopes/crookes.htm

Trivia Question:

Albert Einstein left the world with many ideas for scientists — and the rest of us — to consider.

Part 1: What is “Einstein’s Riddle”, who had the fish, and what percentage of people did Einstein believe could solve this riddle?

Part 2: What Nobel Prize winning experiment, credited to Einstein, is the basis for the detection and measurement of x-ray (and other) photons?

The first person to answer correctly… will win educational materials from the Imagine the Universe! team.

Winner of previous trivia question: H K S.